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☐ 1. Document ID: US 5399418 A Relevance Rank: 52

L1: Entry 1 of 4 File: USPT Mar 21, 1995

US-PAT-NO: 5399418
DOCUMENT-IDENTIFIER: US 5399418 A

TITLE: Multi-ply textile fabric especially for protection suits and the like

DATE-ISSUED: March 21, 1995

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hartmanns; Joerg	Oldenburg			DEX
Mueller-Wiesner; Detlef	Harpstedt			DEX
Kampmann; Lutz	Bremen			DEX
Reimerdes; Hans-Guenther	Ganderkesee			DEX
Fischer; Wolfgang	Fischerhude			DEX

US-CL-CURRENT: 428/218; 139/420R, 139/426R, 139/DIG.1, 2/2.11, 2/243.1, 2/904, 428/212, 428/421, 428/422, 428/446, 428/911, 442/205, 442/219

ABSTRACT:

A multi-ply three-dimensionally bonded textile fabric is provided, to be used especially in making protective space suits, protective space shielding and other protective garments or shields. The fabric is a three-dimensionally woven, knitted, netted, braided or otherwise interlocked structure of threads including organic fibers such as aramid, polyethylene and/or polytetrafluoroethylene fibers and preferably also metallic fibers such as copper, aluminum and/or stainless steel fibers. These fibers are chosen to provide protection against adverse thermal, chemical, electrical and mechanical environmental effects that may be hazardous to an astronaut, for example. The fibers are arranged substantially in respective plies, and each ply is bonded or interlocked only to respective adjacent plies over substantially the entire ply area to provide a flexible multi-ply fabric. The threads are arranged to provide a gradient or variation in characteristics or properties from an outer surface to an inner surface. For example, different types, numbers or densities of threads, or different fabric densities may be used in different plies to achieve a gradient. Such a gradient allows a single, three-dimensionally bonded multi-ply fabric to provide several different protective properties. An outside surface coating of silicone or polymers such as polytetrafluroethylene or ethylene-tetrafluoroethylene may be applied on an outer surface of the fabric to further improve its protective properties.

26 Claims, 6 Drawing figures Exemplary Claim Number: 1
Number of Drawing Sheets: 6

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

☐ 2. Document ID: US 3625206 A Relevance Rank: 49

L1: Entry 4 of 4 File: USPT Dec 7, 1971

US-PAT-NO: 3625206
DOCUMENT-IDENTIFIER: US 3625206 A

TITLE: PROTECTIVE CLOTHING

DATE-ISSUED: December 7, 1971

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Charnley; John	Hale, Cheshire			EN

US-CL-CURRENT: 128/846; 128/847, 128/873, 2/457, 2/458, 2/48

ABSTRACT:

Protective clothing for protecting an environment from contamination by a wearer comprising: an air-impermeable sleeved gown formed with an integral hood having a front opening therein in combination with a face mask in the front opening enabling a wearer to see out of the hood, connections for a suction line to the face mask for drawing air from the region of the wearer's face and cooling the wearer by causing an upward current of air over the body surface and extracting dust particles and bacteria emanating from the wearer's body.

5 Claims, 9 Drawing figures Number of Drawing Sheets: 4

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

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☐ 3. Document ID: US 3751727 A Relevance Rank: 49

L1: Entry 3 of 4 File: USPT Aug 14, 1973

US-PAT-NO: 3751727
DOCUMENT-IDENTIFIER: US 3751727 A

TITLE: SPACE SUIT

DATE-ISSUED: August 14, 1973

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Shepard; Leonard F.	Dover	DE		
Durney; George P.	Dover	DE		
Case; Melvin C.	Dover	DE		
Kenneway, III; A. J.	Dover	DE		
Wise; Robert C.	Dover	DE		
Rinehart; Dixie	Dover	DE		
Bessette; Ronald J.	Wyoming	DE		
Pulling; Richard C.	Dover	DE		

US-CL-CURRENT: 2/2.14; 2/81, 455/575, 600/20

ABSTRACT:

Disclosed is a pressure suit for high altitude flights and particularly space missions. The suit is designed for astronauts in the Apollo Space Program and may be worn both inside and outside a space vehicle, as well as on the lunar surface. It comprises an integrated assembly of inner comfort liner, intermediate pressure garment, and outer thermal protective garment with removable helmet and gloves. The pressure garment comprises an inner convoluted sealing bladder and outer fabric restraint to which are attached a plurality of cable restraint assemblies. It provides versitility in combination with improved sealing and increased mobility for internal pressures suitable for life support in the near vacuum of outer space.

11 Claims, 25 Drawing figures Number of Drawing Sheets: 10

Full | Title | Citation | Front | Review | Classification | Date | Reference
KWIC | Draw Desc | Image

☐ 4. Document ID: US 4923741 A Relevance Rank: 49

L1: Entry 2 of 4 File: USPT May 8, 1990

US-PAT-NO: 4923741
DOCUMENT-IDENTIFIER: US 4923741 A

TITLE: Hazards protection for space suits and spacecraft

DATE-ISSUED: May 8, 1990

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Kosmo; Joseph J.	Seabrook	TX		
Dawn; Frederic S.	Houston	TX		

US-CL-CURRENT: 442/187; 428/328, 428/422, 428/447, 428/458, 428/474.4, 428/911, 442/203, 442/231, 442/246

ABSTRACT:

A flexible multi-layered covering article 10 for protection against the hazards of exposure to the environment of outer space. The covering 10 includes an outer layer section 12 comprising an outermost lamina 14 of woven expanded tetrafluoroethylene yarns (Gore-Tex) for protecting against abrasion and tearing, an underlying weave 16 of meta-aramid yarns (Nomex) and para-aramid yarns (Kevlar) for particle impart protection, an electrostatic charge dissipation and control system 18 incorporated therein, and a chemical contaminants control barrier applied as a coating 19. A middle section includes a succession of thermal insulating layers 21 of polymeric thermoplastic or thermoforming material, each of which is coated with a metal deposit of high infra-red emissivity and low solar radiation absorption characteristics and separated from adjacent insulating layers 21 by a low thermal conductance material 26. The covering 10 further includes a radiation attenuating layer 28 of a tungsten-loaded polymeric elastomer binder for protecting against "bremsstrahlung" radiation and an inner layer 32 of "rip-stop" polyester material for abrasion protection. A chloroprene coating may be supplied the polyester-material for added micrometeroid protection. Securing means 36 of low heat conductance material secures the multi-layers together as a laminar composite.

20 Claims, 3 Drawing figures Exemplary Claim Number: 1
Number of Drawing Sheets: 2